Title: EQUIPPED (*Enhancing Quality of Prescribing Practices for Older Adults Discharged from the Emergency Department*)

PI: E. Camille Vaughan, MD, MS

Team Members

Emory/Grady: Ann Vandenberg, PhD, Michelle Kegler, DrPH, MPH, Traci Leong, PhD, Edidiong Ikpe-Ekpo, MD, MPH, Daniel Wu, MD, Debbie Vigliotti, PharmD, Melissa Stevens, MD, Carolyn Clevenger, DNP, Nick Stanley, Tom Bellnier

Mount Sinai: Ula Hwang, MD, MPH, Denise Nassisi, MD, Nicholas Genes, MD, PhD, Martine Sanon, MD, Sandra Rodriguez, Sylviah Nyamu

Duke: S. Nicole Hastings, MD, MHS, Stephanie Eucker, MD, PhD, Wennie Huang, PharmD

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Federal Project Officer: Deborah Perfetto, PharmD

Structured Abstract

Purpose: We proposed an implementation study to evaluate adaptation in non-VA health systems of the EQUIPPED (*Enhancing Quality of Prescribing Practices for Older Adults Discharged from the Emergency Department*) program, an innovative quality improvement initiative developed within the Veterans Health Administration to reduce potentially inappropriate medication (PIM) prescribing to older adults (≥ 65 years old) discharged from the ED.

Scope: Evaluation of sequential implementation of the VA EQUIPPED program in three non-VA healthcare system EDs.

Methods: Implement EQUIPPED using a quality improvement framework in three non-VA health systems. Evaluate EQUIPPED implementation use the RE-AIM framework.

Results: The EQUIPPED program was successfully implemented in three health systems (Grady Health System in Atlanta, GA; Mount Sinai Health System in New York, NY; and Duke Health System in Durham, NC). Assessment of the sequential approach yielded an implementation package that can be vetted, piloted, evaluated, and finalized for large-scale dissemination in community-based settings. Evaluation of monthly PIM prescribing rates at each of the three implementation sites demonstrated a sustained trend toward improved prescribing, approaching the monthly target of 5% PIMs or less. Evaluation of site- and provider-level factors impacting EQUIPPED implementation will be combined with a second AHRQ-funded spread/scale project that is underway.

Key Words: Polypharmacy, Aging, Geriatrics, Emergency Department, Medication Safety

<u>**Purpose**</u>

The purpose of this study was to achieve the following aims focused on improving medication for older adults (≥ 65 years old) discharged from the Emergency Department (ED):

Specific Aim 1: *IMPLEMENT* EQUIPPED at three non-VA sites (Grady, Duke, and Mount Sinai) to demonstrate feasibility outside the VA system.
   a. Adapt EQUIPPED to be used outside the VA system. Use the *Vision-Analysis-Team-Aim-Map-Measure-Change-Sustain* framework for quality improvement to guide the implementation in the new sites.

Specific Aim 2: *EVALUATE* EQUIPPED in these three sites using the RE-AIM framework.
   a. Assess **reach** of the intervention via use of order sets, and provider knowledge change and diffusion.
   b. Evaluate **efficacy** of the intervention using a pre-post design. The primary outcome is reduction in rates of PIM prescriptions at 12 months. Secondary outcomes will examine monthly rates of re-presentation to the ED, hospitalization, and provider **adoption** of improved prescribing practices through provider surveys and tracking of order set use through provider report.
   c. Evaluate team meeting minutes and implementation team focus groups to measure fidelity of **implementation** at the ED and provider levels for each EQUIPPED component.
   d. Assess factors impacting **implementation** and **maintenance**, including EQUIPPED adaptability, external policies aimed at prescribing quality and patient needs, local implementation climate, characteristics of providers and leadership of the organization, and the process of implementation at each site.

Specific Aim 3: Develop a web-based toolkit for free widespread *DISSEMINATION* to non-VA sites.

SCOPE
Background: Older adults are a vulnerable population at high risk for medication adverse drug events (ADEs) especially when they are discharged from the Emergency Department (ED). Recent studies have found that more than half of older adults discharged from the ED leave with a <u>new</u> prescription medication.[1,2] Multiple studies have demonstrated the risk of receiving a new potentially inappropriate medication (PIM) upon discharge from the ED ranges from 5.6%-13%.[2-7] Prescribing new medications for elderly patients outside the primary care setting increases chances for suboptimal prescribing as well as ADEs, both major reasons for repeat ED visits, hospitalization, or death.[1-8] A systemwide approach to increase patient safety for older adults at the time of ED discharge is the focus of this proposal.

   EQUIPPED (*Enhancing Quality of Prescribing Practices for Older Adults Discharged from the Emergency Department*) is an innovative quality improvement initiative designed to reduce PIM prescribing for adults aged 65 years and older.[9] EQUIPPED comprises three interventions that all address the Patient Safety Research Framework promoted by AHRQ: a) provider education via didactic education and journal club; b) electronic clinical decision support via specialized geriatric pharmacy order sets and links to online educational content at the point of prescribing; and c) academic detailing, including audit and feedback and peer benchmarking. EQUIPPED is informed by the Beers criteria, which are widely used by government agencies and supported by research in various settings[1,6-7] as a marker of prescribing quality. EQUIPPED is currently underway in eight Veterans Affairs EDs under the leadership of Drs. Vaughan and Stevens and a multidisciplinary team, including geriatricians, emergency medicine physicians, pharmacists, nurses, and gerontologists. EQUIPPED implementation sites consistently demonstrate a relative reduction in the use of PIMs by nearly 50% at 6 months.[9,10] Implementation of EQUIPPED also leads to improved self-efficacy by ED providers regarding knowledge of pharmacokinetics for aging patients and strategies to avoid PIM prescriptions.[11]

Context: The geriatric ED is a relatively new care paradigm and will play an increasingly important role in healthcare with the aging of the population. Guidelines for geriatric EDs from professional societies representing emergency medicine, geriatrics, and nursing highlight the importance of tailoring pharmacy and ED-based interventions to the special considerations of aging individuals in order to improve prescribing quality and provide high-quality ED care.[12] Indeed, ED providers often state that they have inadequate knowledge about principles of geriatric care and could benefit from point-of-care prescribing guidelines and newer decision support tools.[13,14] Electronic decision support tools and provider audit and feedback, two key components of EQUIPPED, are proven provider education tools that can be applied in the busy ED setting to improve the safety and quality of prescribing high-risk medications.[15,16]

Settings: <u>Emory University School of Medicine/Grady Memorial Hospital:</u> Camille Vaughan, MD, MS (project PI) is a geriatrician and clinician-investigator with expertise in the management of geriatric syndromes among older adults with multiple comorbid conditions. In her role as the Atlanta VA site Assistant Director for Clinical Programs within the Birmingham/Atlanta Geriatric Research Education and Clinical Center, she facilitated the expansion of the EQUIPPED program from the Atlanta VA, where it was initially implemented by Dr. Melissa Stevens (consultant) and exported to seven additional VA medical centers. Drs. Vaughan, Stevens, Ikpe, Vandenberg, and Clevenger were part of the EQUIPPED implementation at the VA and were ideally situated to participate in the expansion to Grady Memorial Hospital. Dr. Vaughan established a collaboration with Dr. Daniel Wu (co-I, Chief Medical Information Officer, Grady Memorial Hospital), Debbie Vigliotti, PharmD (Medication Safety Officer at Grady), Michelle Kegler, PhD (co-I, Implementation Research), Carolyn Clevenger, DNP (co-I, Process Improvement), and Traci Leong, PhD (biostatistics), to develop the protocol for EQUIPPED implementation and evaluation in the Grady ED, a level-1 trauma center and safety-net hospital in Atlanta. Dr. Vaughan worked closely with Dr. Ikpe, who served as Co-I and ED Physician Champion at Grady, an urban safety-net hospital in Atlanta.

<u>Icahn School of Medicine at Mount Sinai/Mount Sinai Hospital:</u> Dr. Ula Hwang (co-PI, site PI) is a nationally recognized expert in the development of geriatric ED models of care. Dr. Hwang serves as co-PI and Innovation Lead on a Centers for Medicare and Medicaid (CMS) Health Care Innovation Award ($12.7M), *Geriatric ED Innovations in Care through Workforce, Informatics, and Structural Enhancements (GEDI WISE)*, to study the impact of geriatric ED models of care on improving the health, healthcare, and costs of Medicare beneficiaries seen in the ED setting. Additionally, she served on the Geriatric ED Task Force to develop national guidelines for geriatric ED care. She has received NIH funding to investigate CDS tools to guide the assessment and treatment of abdominal pain among older adults evaluated in the ED. Additionally, she serves as PI on a VA Merit grant that is a multicenter comparative study of analgesic safety and effectiveness in veterans with arthritis. Dr. Hwang's team included Dr. Nassisi (co-I and chief of the geriatric ED), Dr. Sanon (geriatrician), and Dr. Nicholas Genes (EPIC Informatics) to implement EQUIPPED at Mount Sinai Hospital, an urban, tertiary-care, level-3 trauma ED serving a diverse population in New York City.

<u>Duke University School of Medicine/Duke University Medical Center:</u> Dr. S. Nicole Hastings (co-PI, site PI) is a geriatrician and nationally recognized expert in the evaluation of prescribing practices for older adults evaluated in the ED. Dr. Hastings is a Research Health Science Specialist in the Health Services R&D Center of Excellence and a Core Investigator in the Geriatrics Research Education and Clinical Center at the Durham VA Medical Center. She is an Associate Professor of Medicine in the Division of Geriatrics at the Duke University School of Medicine and Senior Fellow in the Duke Center for the Study of Aging and Human Development. Dr. Hastings' research focuses on improving transitions of care for older adults. Other research interests include the organization and delivery of emergency care to older adults and its impact on health outcomes, and prevention of hospital-associated disability. She served as the site lead for the Durham VA EQUIPPED implementation. Dr. Hastings's team included a Duke Emergency Medicine physician, Dr. Stephanie Eucker (co-I and Duke ED physician champion), to implement EQUIPPED at Duke University Medical Center ED, a small, urban, level-1 trauma center.

Participants: Each year during the 3-year funding period, EQUIPPED was adapted and implemented at one of three non-VA sites. All the sites used a common electronic health record (EHR, i.e., Epic), which allowed the teams to easily share order set logic between sites. Primary adaptations addressed the specific education infrastructure for staff and residents, ED climate with regard to staffing shifts, and procedures for modifying order sets per local formularies and pharmacy service recommendations. Phases of the implementation plan were rolled out by each local EQUIPPED site PI and led by the physician champion at each ED site. Local implementation meetings were determined by the site PI and ED champion. Twice-monthly EQUIPPED leadership team teleconferences and regular communication with the Program Coordinator ensured sharing of information regarding implementation progress in order to discuss strategies for success. The frequency of communication followed the model of implementation at VA sites. The target clinicians for EQUIPPED were attending (faculty) physicians and advanced practice providers (i.e., physician assistants, advanced practice nurses) at the three hospitals. These clinicians were targeted, because they are a more consistent and continuously present group of ED clinicians. Additionally, attending physicians and advanced practice providers are more reflective of staff employed by most EDs in the community setting.

Prevalence: Previous evidence suggests that the prevalence of PIM prescribing at ED discharge for older

adults ranges typically from 5.6%-13%.[2-7] Common PIM drug classes prescribed in the ED for older adults being discharged include centrally acting antihistamines, muscle relaxants, and benzodiazepines.

METHODS

Data Sources: Five data sources were used to answer our evaluation questions.

1) **Focus Groups with Implementation Teams:** Focus groups with implementation teams were conducted at each site in the third quarter of the implementation year. All members of the implementation team were eligible to participate. Team membership varied by site, but we had five to eight members representing: ED physician champion, EPIC analyst, data analyst, pharmacy service leadership, ED providers (attending MD, APRN/PA), pharmacists, practice improvement nurses, and site PIs. Focus groups will be moderated by Dr. Kegler and her staff, experienced in focus group facilitation.[17-22] The evaluation team developed a discussion guide that contained open-ended questions that focus heavily on the implementation process, as informed by the consolidated framework for implementation research (CFIR).[23]

2) **Implementation Team Meeting Agendas and Minutes**: As part of the implementation process, implementation teams were formed at each site and met at least monthly, either in-person or via teleconference, with agendas and meeting minutes. Similar to the VA implementation strategy, we had EQUIPPED leadership team (including all site PIs, ED champions, and key site personnel) teleconferences twice monthly to discuss site-specific factors and strategize solutions through collaboration. The evaluation team analyzed agendas and minutes using qualitative methods to identify planning steps, timeline for implementation, and barriers encountered in each site. These were used to inform the focus groups and to develop draft implementation timelines and lists of barriers to be examined in more depth through focus groups. They also informed our implementation fidelity measures.

3) **Academic Detailing Staff Logs:** Each site designated at least one individual to serve as an academic detailer to have one-on-one meetings with providers to share provider feedback on PIM prescriptions. These individuals maintained program records that document which providers have received the feedback and the date of the academic detailing meeting.

4) **Provider Surveys on CFIR Constructs:** Surveys were administered to characterize the implementation environment and identify predictors of implementation success. Data were collected in the third quarter of the implementation year for each site. We will survey those who have at least 3 months as an ED provider (attending MD, APRN, PA) with at least three ED shifts worked per month. Measures were adapted from a similar survey developed and tested by Dr. Kegler and members of the Cancer Prevention and Control Research Network (CPCRN), a national network of academic, public health, and community partners who work together to reduce the burden of cancer through dissemination and implementation research.[24] The CPCRN developed and tested psychometric properties of 16 of 39 CFIR constructs and subconstructs.

5) **Local Facility Corporate Data Warehouse:** Data were extracted from the corporate data warehouse at each implementation site to calculate the proportion of PIMs prescribed to adults aged 65 and over and discharged from the ED. Data for the secondary outcomes related to healthcare utilization were also available through these data repositories.

Study Design: Prospective evaluation of the sequentially implemented EQUIPPED medication safety program over 3 years in three different health system EDs.

Interventions: The three core components of EQUIPPED are a) provider education, b) EHR-based clinical decision support (CDS) including pharmacy quick order sets to facilitate provider order entry, and c) provider audit and feedback with peer benchmarking. Each hospital had unique characteristics, which required specific adaptations. We closely tracked this key information in informing the development of a toolkit to promote dissemination of EQUIPPED broadly across diverse geographic locations and patient demographics throughout the country.

Adaptation from VA implementation
Each site first adapted the EQUIPPED order sets implemented at the Atlanta VA, which included treatment suggestions for common conditions leading to discharge from the ED for older adults. Adaptations included tailoring antibiotic options for local antibiotic resistance patterns in consultation with local antibiotic stewardship experts or determining if an order set was needed based on regional differences in care (e.g., poison ivy care was not needed in a northeastern US metropolitan ED). All the sites engaged in this implementation were part of the health systems with the Epic electronic health record. The first site worked

with the local order set approval team to determine the optimal location for order set placement within the discharge workflow to easily facilitate provider use. The strategy implemented at the first implementation site was subsequently adopted by the second and third site.

Teams also worked with local data extraction services to optimize collection of monthly prescribing data for the provider feedback reports. A tool developed within the VA clinical data warehouse to quickly identify potentially inappropriate medications according to the AGS Beers criteria was adapted for use. The initial site received data through the health system's pharmacy service, which then required processing by an EQUIPPED team member to create the provider reports. The second site leveraged the VA tool to develop a pivot table in Excel that was used within Tableau to create provider reports more quickly. The use of Tableau as a data visualization tool was also implemented by the third site, which facilitated the provider feedback development process.

Implementation of provider feedback at VA sites involved an initial one-on-one session with a local EQUIPPED champion. Most VA ED sites included a staff provider group of eight to 20 providers (including MDs and APPs). Two of the three non-VA sites described here represented larger ED provider groups, with 70-80 MDs and APPs. Thus, providing an initial one-on-one feedback session in a single month was not practical. At the first site, the implementation team decided to conduct the one-on-one session with a provider when they received their first report with a PIM prescription. This adaptation lead to a majority of providers receiving a report within the first 3 months of the post-implementation period. The second site implemented the one-on-one feedback with three different EQUIPPED champions delivering feedback. The third site had a smaller provider group and was able to reach all providers with at least one initial in-person feedback session. The third site also conducted a subsequent in-person feedback session with providers who continued prescribing PIMs above the threshold of 5% per month.

Measures: To assess the RE-AIM constructs, specific measures of interest included the following:
<u>Reach:</u> Attendance records from training sessions, EQUIPPED staff logs, provider survey assessments
<u>Effectiveness:</u> Change in monthly PIM prescription rates; PIMs were defined according to the 2015 American Geriatrics Society Beers Criteria prescribed to persons aged 65 and older and discharged from the ED by MDs and APPs. Supplies were excluded.
<u>Adoption:</u> Assessed through focus groups
<u>Implementation:</u> Attendance records from provider trainings, focus groups, implementation team notes and agendas
<u>Maintenance:</u> focus groups and sustainability of EHR changes

Primary Outcome Analysis:
The primary effectiveness outcome of interest was the monthly PIMs rate. Poisson regression was used to compare the percentage of PIMs prescribed in the 6 months before the first EQUiPPED intervention with 12 months after the completion of the EQUiPPED intervention (see Table 1). Rate ratios (RRs) and their respective 95% confidence intervals (CIs) were calculated to compare the pre- and post-EQUIPPED periods.

Additionally, generalized linear models assuming a Poisson distribution for the monthly PIMs rates were fitted. The total number of prescriptions served as the offset term in the model, and a piecewise, nonlinear regression model was used to evaluate the pattern of PIMs prescriptions over time. All models contained three basic parameters accounting for the pre-intervention trend (pre-intervention slope), the change in level at the intervention point, and the difference in trend between the two periods (change in slope from pre-intervention). Correlograms were used to check for autocorrelation in the residuals using the Durbin Watson test. The standard errors were calculated based on the Newey-West method to account for the autocorrelation. Based on observed autocorrelation, the post intervention trend was adjusted by 1- to 3-month lags, depending on the institution. We conducted all analyses by using the statistical software R, version 3.0.1 (R Foundation for Statistical Computing, Vienna, Austria), and P values of .05 or less were considered statistically significant.

Limitations: Due to the sequential implementation plan, the team determined that we would limit follow-up data to 12 months post-implementation at each site. The sample size to assess site-level factors influencing implementation was relatively small (n=3). The team was funded to spread and scale EQUIPPED

through a subsequent award; thus, the decision was made to include the spread site in this analysis. Data collection for the final site is currently in process.

RESULTS

Principal Findings: EQUIPPED is a medication safety program that is adaptable across health systems with different EHRs and clinical data warehouse architectures. Overall PIM prescribing rates at each site were not statistically significant within the 12 month post-intervention period; however, reductions in certain high-risk classes of drugs were observed, such as a decrease in benzodiazepine prescriptions at all sites as well as musculoskeletal relaxant prescriptions at site 3. An implementation toolkit including 10 process elements to facilitate successful implementation was developed from the sequential implementation approach.[25]

Outcomes:
Site characteristics of the three implementation sites are described in Table 1. Briefly, two sites were level-1 trauma centers, and the third was a level-3 trauma center. Annual ED encounters ranged from approximately 80,000 to 140,000, with 15-20% of the patients seen classified as 65 years of age and older across the sites. Prescribers at each site included attending physicians, advanced practice providers, and resident physicians. Two sites also had pharmacists in the ED. One of the EDs was accredited as a level-1 geriatric ED at the time of implementation. The other two sites had existing EHR-based alerts that activated as an on-screen alert if providers selected certain potentially inappropriate medications. Ten process components aimed at easing implementation by providing technical and logistical assistance were identified from the sequential implementation approach and have been described previously.[25]

PIM prescribing over time: At site 1, comparison between the baseline and intervention periods combined to post-intervention were significant, with rates of 5.96% versus 5.11% (p=.0120) (Figure 1), respectively; however, comparisons between baseline only versus intervention (or post intervention) were not significantly different. Globally, the time series shown in Figure 1 exhibits a negative trend, with the solid red line representing the fit of the time series; the dotted red line was associated 95% confidence interval. At site 2, comparisons with baseline and baseline+intervention versus post intervention were not significantly different (p=.4951 and p=.6122, respectively). The time trend was not significantly decreasing (p=.624) (Figure 2). At site three, comparisons with baseline and baseline+intervention versus post intervention were not significantly different (p=.8261 and p=.8476, respectively). The time trend was not significantly changed (p=.642) at 12 months (Figure 3).

Although the overall PIM rates did not decrease significantly over time at any of the sites, prescribing of specific high-risk drug classes did improve. At all sites, the proportion of benzodiazepine prescriptions decreased from approximately 17% of PIMs at baseline to 10-12% post-implementation. Additionally, at site 3, the proportion of musculoskeletal relaxants decreased significantly compared with baseline decreasing from 24.5% to 14.5% (Table 2).

Discussion: All three sites successfully implemented the core components of the EQUIPPED medication safety program. Lessons learned were provided to subsequent sites based on the sequential implementation approach. Sequential implementation produced a set of 10 process elements that may facilitate broader dissemination of the EQUIPPED medication safety model by assisting team in identifying common barriers and facilitators.

Statistically significant reductions in PIM prescribing rates were not seen consistently across the three implementation sites. Contributing factors included that the sites had relatively low baseline PIM prescribing rates, and only 12 months of data were available for the evaluation based upon funding support for the data extraction. In this initial export of the EQUIPPED program, sites were selected based on champions at each site with previous VA EQUIPPED implementation experience. Additionally, the three non-VA sites had the same EHR, facilitating implementation of the clinical decision support tools across the sites.

Despite not observing consistently an overall site-level reduction in PIM rates at the sites, a trend toward reduced prescribing of certain high-risk drug classes, specifically benzodiazepines, was observed at all three EQUIPPED sites. At the third site, a specific focus on musculoskeletal relaxants during detailing also resulted

in a significant and sustained reduction. These results suggest that, among sites with baseline PIM prescribing rates that are closer to the EQUIPPED target of 5% or less, a focus on specific problematic drug classes may be a more meaningful approach to continue to promote improvement.

Conclusions: The EQUIPPED medication safety program is adaptable to non-VA healthcare settings and sequential implementation permitted sharing of resources that facilitated implementation, particularly with regard to the order sets and the data collection necessary to give provider audit, feedback, and peer benchmarking monthly reports. Data visualization platforms such as Tableau also facilitated greater automation for the production of monthly provider feedback reports.

Significance: EQUIPPED represents a feasible quality improvement program to improve medication safety toward older adults in the ED setting. Early results from the three sites do not show statistically significant reduction in all PIM classes; however, there was a trend toward reduced prescribing of some high-risk medication classes.

Implications: It is feasible to implement the EQUIPPED program across multiple health systems and geographic regions. An implementation package has been developed that can be vetted, piloted, evaluated, and finalized for large-scale dissemination in community-based settings. Achieving significant reduction in specific high-risk drug classes may be a more appropriate target for improvement for sites that have relatively low baseline PIM prescribing rates.

Table 1: Emergency Department site characteristics at baseline

Domain	Site 1	Site 2	Site 3
Location	Southeastern urban United States	Northeastern urban United States	Southeastern suburban United States
Complexity level	Level-1 trauma center	Level-3 trauma center	Level-1 trauma center
Patient population (size and estimated % geriatric)	139,728 Emergency Department encounters 15% geriatric	110,593 Emergency Department encounters 19.1% geriatric	79,258 Emergency Department encounters 21.2% geriatric
Provider population (size and makeup)	53 Attendings 62 Residents 11 Physician assistants 27 Nurse practitioners 5 Pharmacists	32 Attendings 67 Residents 26 Physician assistants 2 Nurse practitioners 0 Pharmacists	38 Attendings 31 Residents 13 Physician assistants 0 Nurse practitioners 1 Pharmacist
Geriatric resources	Existing potentially inappropriate medication alerts as part of the Acute Care for the Elderly (ACE) unit	Geriatric ED accredited level 1	Existing potentially inappropriate medication alerts for zolpidem, indomethacin, and glyburide
Presence of: Onsite pharmacy ED geriatric pharmacist	Yes No	No No	Yes Yes
Monthly avg. baseline PIM % (95% CI) (6 months)	5.64 (4.96-6.31)	5.79 (5.02-6.57)	7.83 (6.43-9.22)

*Adapted from Vandenberg et al. *Int J Qual Health Care.* 2020;32(7):470-476.

Table 2: Pre-post PIM prescribing and specific PIM drug classes

	Pre-EQUIPPED (%) (95% CI for *All PIMs*)*	Post-EQUIPPED (%) (95% CI for *All PIMs*)*	p value**
Site 1			
All PIMs	5.64 (4.96-6.31)	5.13 (4.72-5.54)	0.02
Benzodiazepine	16.6	9.5	0.04
Skeletal muscle relaxant	34.4	36.9	0.44
Antihistamine	15.8	13.4	0.15
Site 2			
All PIMs	5.79 (5.02-6.57)	5.41 (4.83-5.99)	0.62
Benzodiazepine	16.92	10.03	0.09
Skeletal muscle relaxant	21.9	21.32	0.84
Antihistamine	49.3	49.2	0.57
Site 3			
All PIMs	7.3 (6.43-9.22)	7.53 (6.62-8.43)	0.62
Benzodiazepine	17.3	12.0	0.05
Skeletal muscle relaxant	24.5	14.5	0.04
Antihistamine	38.2	43.2	0.52

*percentages for specific PIM classes represent the % of that class among all PIM prescriptions

**p value represents general time series model assuming a Poisson distribution

Figure 1: General Time Series Analysis of Trend PIM Rate – Site 1 (Poisson distribution)
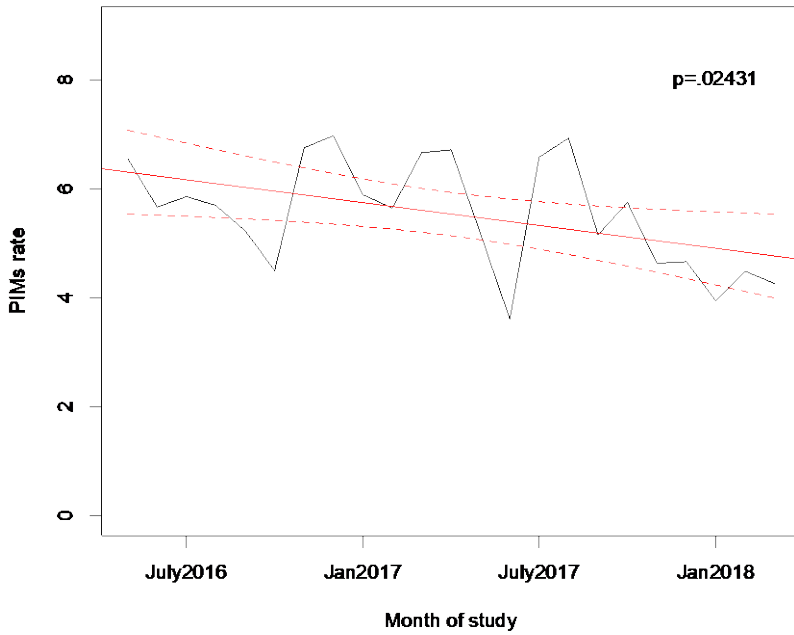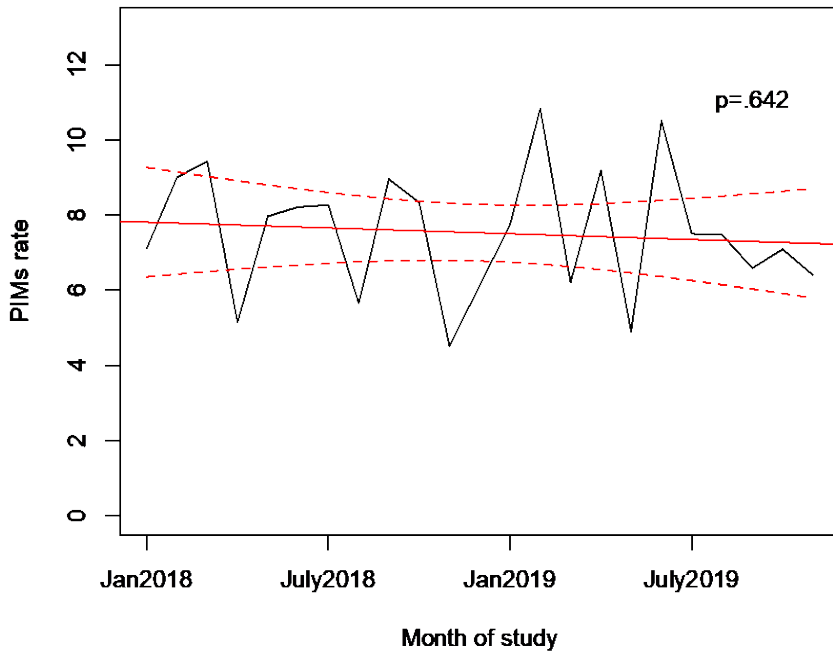

The solid red line represents the fit of the time series, and the dotted red line is the associated 95% confidence interval.

Figure 2: General Time Series Analysis of Trend PIM Rate – Site 2 (Poisson distribution)
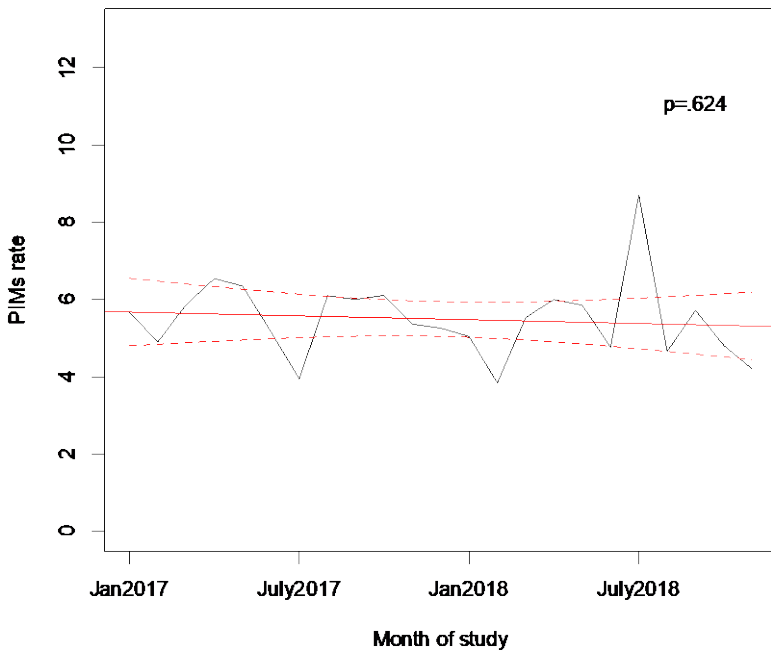
The solid red line represents the fit of the time series, and the dotted red line is the associated 95% confidence interval.

Figure 3: General Time Series Analysis of Trend PIM Rate – Site 3 (Poisson distribution)

p=.642

The solid red line represents the fit of the time series, and the dotted red line is the associated 95% confidence interval.

List of Publications and Products:

http://www.aging.emory.edu/programs/equipped/index.html

Vandenberg AE, Kegler M, Hastings SN, Hwang U, Wu D, Stevens M, Clevenger C, Eucker S, Genes N, Huang W, Ikpe-Ekpo E, Nassissi D, Previll L, Rodriguez S, Sanon M, Schlientz D, Vigliotti D, Vaughan CP. Sequential implementation of the EQUIPPED geriatric medication safety program as a learning health system collaborative. *Int J Qual Health Care* 2020;32(7):470-476.

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